WORKING PAPER SERIES

Age Distributions and Returns of Financial Assets

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Working Paper 1994-002A
http://research.stlouisfed.org/wp/1994/94-002.pdf

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AGE DISTRIBUTIONS AND RETURNS OF FINANCIAL ASSETS

February 1994

ABSTRACT

This paper explores the relationship between age distribution and asset returns impled by an overlapping-generations asset pricing model. The model predicts that as more individuals reach the age when the increment to their wealth reaches its maximum, asset returns fall.

Cross-sectional evidence from the Survey of Financial Characteristics of Consumers and the Surveys of Consumer Finances indicates that individuals aged 45 to 54 have the largest increment to wealth of all age group. Time series estimates confirm that a close link exists between aggregate household wealth and the size of this age group. In accordance with the model presented in this paper, time series estimates of the relationship between asset returns and age distribution suggests a large, statistically significant, negative correlation between the fraction of the population aged 45 to 54 and the returns of several types of assets.

KEYWORDS: Asset pricing, demographics

JEL CLASSIFICATION: D91, E44, G12, J11

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I would like to thank Ben Friedman, Greg Mankiw, Mike Pakko, Joe Ritter, Steve Schran, Jon Skinner, Jim Thomson, David Weil and Philippe Weil for their helpful comments and suggestions. Rich Taylor provided excellent research Assistance. All remaining errors are mine.

I. Introduction

Two recent papers have focused on the population's age distribution as a possible source of low frequency movement in asset prices. Mankiw and Weil [1989] posit that the demand for housing and the growth of the adult population are correlated. The maturing of the baby boomers during the 1970's accelerated the rate of household formation, which in turn, increased the demand for housing and thus, increased the real price of housing. Consistent with their hypothesis, they find a positive relationship between the rate of household formation and the real price of housing during the post-war era. Bakshi and Chen [1994] argue that as the population ages, the demand for housing decreases while the demand for securities increases. They find that real S&P 500 prices covary positively with the average age of the U.S. population for the post-war period.

The surprising aspect of the literature is not that such relationships exist among asset prices and the population's age distribution, but that such a direct implication of standard models with demographic variables has received so little attention. For example, the life-cycle hypothesis suggests that a young population has more saving than an old population. The differences in the supply of saving imply that the age structure of the population affect asset returns.

In this paper, I present a multiperiod, overlapping-generations asset pricing model that explores the relationship between an economy's age distribution and asset returns. The model predicts that the relative size of the age group with the largest increment to their lifetime wealth has the largest negative relationship with asset returns. Cross-sectional evidence from the 1983 Survey of Consumer Finances indicates that individuals aged 45 to 54 have the largest increment to wealth of any age group. Time series estimates confirm that a close link exists between aggregate household wealth and the relative size of this age group. In accordance with the model presented in this paper, time series estimates of the relationship between asset returns and the economy's age distribution find a large, statistically significant, negative correlation between the fraction of the population aged 45 to 54 and the returns of several types of assets.

The paper proceeds as follows. First, I review a multiperiod overlapping-generations asset pricing model that formally describes the relationship between cohort size and asset returns. I then verify the empirical validity of the model in three steps. I first use cross-sectional evidence from the 1983

Survey of Consumer Finances to estimate the empirical relationship between wealth and age. Next, I turn to estimates of aggregate household wealth to verify the existence and stability of the wealth-age relationship found in the household data. Finally, I present time series estimates of the relationship among several types of financial asset returns and the population age distribution.

II. A Multiperiod Asset Pricing Model

A multiperiod overlapping-generations version of the Lucas [1978] asset pricing model is an obvious way to think about the relationship between the age distribution and asset returns. Agents maximize their lifetime utility subject to an age dependent path of endowments. Consequently, the quantity of assets they choose to hold at any given time will depend on their age. This difference in asset holdings, when aggregated, affects the size of total household wealth, and thus, induces a relationship between the population's age distribution and the returns to assets.

A. Model

Each agent spends T_c years in childhood, retires at age T_a, and dies at age T_l. The agent also maximizes his lifetime utility subject to a lifetime budget constraint.

$$\max \sum_{s=1}^{T_l} (1+\delta)^{1-s} \frac{c_{t+s-1,s}^{1-\rho}}{1-\rho}, \tag{1}$$

subject to the budget constraint,

$$a_{t+s-1,s} = (1 + r_{t+s-1})\, a_{t+s-2,s-1} + e_s - c_{t+s-1,s}. \tag{2}$$

$c_{t,s}$ and $a_{t,s}$ are consumption and asset holdings of an agent s years old in period t. r_t is the rate of return for holding an asset between periods $t-1$ and t. e_s is the endowment of a non-storable good received by an agent s years old. δ is the subjective discount rate, and ρ is the coefficient of relative risk aversion.

In equilibrium, aggregate consumption must equal aggregate endowment every period,[1]

$$\sum_{s=1}^{T_l} \varphi_t(s)\, e_s = \sum_{s=1}^{T_l} \varphi_t(s)\, c_{t,s}, \tag{3}$$

where $\varphi_t(s)$ is the age distribution of the population in period t.

Given the level of generality, no closed form solution to the above problem exist but numerical solutions for the equilibrium asset prices are possible.

B. Simulation

Varying $\varphi_t(s)$, then solving (1) and (3) for r_t determines the relationship between a population's age distribution and asset returns.[2] Since the baby boom is the most prominent feature of modern U.S. demographic history, I use a stylized baby boom, a temporary doubling of the annual population growth rate from one percent to two percent for fifteen years, as an interesting change in the population distribution, $\varphi_t(s)$.[3] The simulation assumes that the start and the end of the baby boom are unexpected shocks to the population growth rate. Table 1 shows the value of the other model parameters, which are equal to those used by Auerbach and Kotlikoff. The endowment pattern also corresponds to the pattern used by Auerbach and Kotlikoff, with individuals 20 years old and younger, as well as those over 65, receiving no endowments. I normalized the endowment pattern so that $e_{21} = 1$.[4]

The simulation shows that fluctuations in the population age distribution produce changes in asset returns.[5] The top panel of figure 1 shows the path of asset returns and the fraction of the population aged 45, and it shows a clear negative relationship between the two variables. The simulation also indicates that the magnitude of the relationship is on the order of two, that is a percentage point change in the relative size of the 45 year old group

[1] Appendix A outlines the model with investment in productive capital, where asset returns are then equal to the rate of return of capital.

[2] This is similar to Auerbach and Kotlikoff [1987].

[3] The population growth rate nearly doubled from an annual rate of one percent during the period before 1947 to an annual rate near two percent for the fifteen or so years of the baby boom. Thereafter, the growth rate returned to the previous rate, although it has now fallen below one percent.

[4] The endowment pattern has the functional form $e_s = exp\left(4.47 + 0.033s - 0.00067s^2\right)$.

[5] The simulation results from the model with productive capital is very similar to that of the asset pricing model.

corresponds to a two percent point change in asset returns. The simple correlation between the two series is near 0.9.

Why is the relative size of 45 year old agents so important in determining the returns of assets? The bottom panel of figure 1 suggests that the age groups with the largest positive increment to wealth should have the largest negative correlation with asset returns. It shows two plots: the correlations among asset returns and the relative sizes of the endowment receiving age groups, and the changes in wealth for each age s, $\Delta a_{t,s} = a_{t,s} - a_{t-1,s-1}$. The correlations reach a maximum, in absolute value, at 45, the age with the largest increment to wealth. Intuitively, this is very appealing. The relative supply and demand for saving determines the rate of returns for assets. So, the age group that has the largest positive increment to wealth has the largest positive impact on the relative supply of saving, and thus, has the largest negative relationship with asset returns.

The results of this model adds the understanding of the effects of demographic variables on assets considered by Mankiw and Weil, and Bakshi and Chen. The model suggests that a population's age structure affects a much wider class of assets than housing. It also suggests that a population's average age does not fully capture the age dependence of asset prices. So the results of this paper's model is consistent with the behavior of asset prices after 1945, the period studied by Bakshi and Chen, but eventually, the two models predict different paths of asset prices as the baby boomers continue to age due to the nonlinear effect of a baby boom in my model. The model, however, makes no predictions about any differences in the response of various assets to changes in the demographic composition of the population, whereas Bakshi and Chen predict changes in the equity premium as the population ages. This is most likely due to the assumption of absolute risk aversion by Bakshi and Chen.

III. The Empirical Relationship

Given the simulation results above, I now turn to the empirical verification of the simulation's results in three steps. First, I examine cross-sectional evidence from a household survey to determine the wealth age profile of households, indentifying the age group with the largest increment to wealth. Next, I check the stability of the cross-sectional finding by determining the age group with the largest correlation with aggregate household wealth. Finally, I estimate time-series regressions to see if asset returns and age distribution are related in the manner predicted by the model.

A. Cross-Sectional Estimates

The model suggests that the age groups with the largest increment to wealth should have the largest negative correlation with asset returns. I, therefore, use the 1983 Survey of Consumer Finances to determine which age group has the largest increment to wealth.[6]

To determine the wealth-age relationship, I estimate cross-sectional regressions using gross assets and net worth as measures of wealth.[7] The regressions control for income and other household characteristics with dummy variables for the five age groups, 25-34, 35-44, 45-54, 55-64 and 65+. I use these age groups because they correspond to the aggregate time series data used in the next two sections. The estimated regression is

$$\begin{gathered} wealth_i = \alpha_0 + \alpha_1 age\text{: 25-34}_i + \alpha_2\ age\text{: 35-44}_i \\ +\alpha_3\ age\text{: 45-54}_i + \alpha_4\ age\text{: 55-64}_i + \alpha_5\ age\text{: 65}_i^{+} \\ +\alpha_6\ \#\ of\ children_i + \alpha_7\ \#\ of\ adults\ _i + \alpha_8\ \#\ of\ retired_i \\ +\alpha_9\ gender_i + \alpha_{10}\ race_i + \alpha_{11}\ married_i + \alpha_{12}\ high\ school_i \\ +\alpha_{13}\ college_i + \alpha_{14}\ \#\ working_i + \alpha_{15}\ total\ income_i \end{gathered} \tag{4}$$

Table 2 presents the estimated coefficients of the dummy variables for the different age groups from cross-sectional regressions (4) using the 1983 Survey of Consumer Finances.[8] The regressions suggest that the ages between 45 and 54 represent a turning point in a household's pattern of accumulated wealth and indebtedness. The change in wealth is nearly \$80,000, going from a value of $\alpha_2 = -39$ to $\alpha_3 = 41$, a large change in gross and net wealth between households aged 35 to 44, and those aged 45 to 54.[9] The F-statistics

[6] See Avery, et al. [1984a, 1984b and 1986] for some discussion about the survey.

[7] Gross assets include: checking accounts, money market accounts, savings accounts, IRAs, CDs, savings bonds, bonds, stocks, mutual funds, trust accounts, cash value of whole life insurance, loans owed to household, gas leases, gross value of land contracts, current value of home, and gross value of other properties. Net wealth equals gross assets less total debt.

[8] Estimating the cross-sectional regressions without the demographic factors correlated with age, as in Mankiw and Weil, does not change the basic relationship illustrated in table 2. In fact the pattern observed in table 2 becomes even more pronounced, indicating that the increase in the wealth of households aged 45 to 54 is even greater than indicated.

[9] The increase in wealth need not arise from a change in the saving rate of an individual. An increase in labor income, which according to estimates from household surveys, reaches its peak between the ages of 45 and 54, will also increase the wealth of a household. Using aggregate quarterly data between 1954:1 and 1988:4, Fair and Dominguez [1991] find that consumption relative to disposable income reaches its minimum near the age of forty years.

shown in table 2 are for the hypothesis that the dummy variables for the five age groups do not covary with wealth or debt, and in all three cases, the evidence rejects the hypothesis that the coefficients for the age dummies are insignificant at the one percent significance level.

From the estimates of the wealth-age profile it appears that individuals aged 45 to 54 have the largest increase in accumulated wealth of all age groups. While older groups may continue to save, the incremental changes in wealth are not as large as the increase observed among the ages 45 to 54.[10]

This result is appealing on an intuitive level. Younger households have relatively low labor income and high expenditures associated with buying houses and raising and educating their children. Between the ages of 45 and 54 most households' children have completed their schooling and left home. Furthermore, households in this age group are reducing their indebtedness from mortgages and other loans, and are enjoying peak labor income.[11]

B. Aggregate Wealth-Age Relationship

The cross-sectional regressions identify the age between 45 and 54 as the age when wealth accumulation occurs most rapidly. This implies an existence of a strong positive relationship between the relative size of the age group 45 to 54 and the size of aggregate household wealth, provided aggregation does not distort the relationship between age and wealth, and

[10] Ando and Kennickell [1987] suggest that a sample selection bias may exist in estimates of household wealth of retired individuals when the sample comes from household surveys because the surveys include only those retired households with sufficient means to support themselves during retirement. Those unable to support themselves are most likely living with their children or in nursing homes. If Ando and Kennickell's suggestion is true, the means and cross-sectional regression estimated overstate the wealth of the post-retirement individuals.

Shorrocks [1975] suggests that wealthy individuals have longer life expectancies. Therefore estimates based on individuals may overstate the wealth of the representative agent.

Bosworth, et al. [1991] and other studies based on household surveys indicate little or no correlation between the life-cycle stage of a household and its saving rate. Studies based on aggregate data suggest that private saving rates increase as the population reaches retirement age and decreases after retirement. Weil [1992] offers a possible solution to this discrepancy. He suggests that household data do not reflect the dissaving of the retirees because the data fails to capture the anticipatory spending of bequests by the younger generation. Accounting for bequests appears to minimize the discrepancy.

[11] The survey indicates that peak household income occurs between the ages of 45 and 54.

the relationship is relatively stable over time.

To test this implication, I use estimates of aggregate household wealth for the years 1946 to 1988 from the Federal Reserve's *Balance Sheets for the U.S. Economy: 1949 to 1990.* The publication contains estimates of aggregate household wealth – gross assets, net wealth, and net purchases of equities – which I converted into 1982 dollars and in per capita terms. Gross assets include deposits and credit market instruments, corporate equities, life insurance, and few other financial assets, as well as reproducible assets and land. Net wealth subtracts total liabilities from gross assets. I detrended the two measures of aggregate wealth by estimating a log-linear regression of the respective measures of aggregate wealth against a time trend. I then use the residuals from these regressions as the dependent variables of the time-series regression linking aggregate household wealth and the age distribution of the U.S.

The Historical Statistics of the United States and various issues of the *Current Population Reports: Population Estimates and Projections, series P-25* publishes the sizes of the different age groups for the years 1926 to 1988. I convert the size of each age group into its fractional size of the population before estimation.

Figure 2 shows a clear relationship between the fraction of the population aged 45 to 54 and the net household purchases of equities, a simple measure of a demographic induced change in household wealth.[12] Since the increment to an individual's wealth reaches its maximum when he is between the ages of 45 and 54, the net purchases of equities, a measure of the increases in aggregate wealth, should follow the relative size of this cohort.

Table 3 shows the results of the time-series estimates of the relationship between detrended log wealth and the fraction of the population aged 25-34, 35-44, 45-54, 55-64 and 65 or older. The standard errors shown in the table reflect the Newey-West correction for serial correlation with the lag length determined by Schwartz information criteria. The regressions reveals a large, statistically significant (at 10 percent significance level), positive relationship between the proportion of the population aged 45 to 54 and the growth of the aggregate household wealth measures.

The results of the time-series estimates of the relationship among the growth rate of aggregate household wealth and the relative sizes of the age groups support the pattern observed in the cross-sectional analysis. As the relative size of the population with the largest positive increment to wealth

[12]The simple correlation between the two series is 0.75.

increases, the growth rate of aggregate household wealth should accelerate, and indeed, the results of this section suggests that this is true.

C. Age Distributions and Asset Returns

The previous two sections imply that the 45 to 54 age group has the largest increment to wealth, and that changes in aggregate household wealth reflect this relationship between age and wealth. I now turn to see if the empirical evidence matches the model's prediction about the relationship between the age structure of the population and asset returns.

Stocks, Bills, Bonds, and Inflation: Yearbook 1991 published by Ibbotson and Associates contains data on real annual total returns of the following types of U.S. securities: common stocks, small company stocks, long-term corporate bonds, long-term government bonds, intermediate-term government bonds and Treasury bills, for the years 1926 to 1990.[13]

The following equation estimates the reduce form relationship implied by the model:

$$\begin{aligned} R_t = \beta_0 + \beta_1 \textit{ aged: } 25\text{-}34_t + \beta_2 \textit{ aged: } 35\text{-}44_t \\ +\beta_3 \textit{ aged: } 45\text{-}54_t + \beta_4 \textit{ aged: } 55\text{-}54_t + \beta_6 \textit{ aged: } 65_t^+ \end{aligned} \tag{5}$$

The simulation results suggest that the age group with the largest positive increment to wealth has the largest negative correlation with asset returns. This result, combined with the results from the two previous sections, implies that the sign of β_3 should be negative and the largest in magnitude.

I first checked the stationarity of the asset returns and the relative sizes of the age groups. In all cases, the augmented Dickey-Fuller test rejects the null hypotheses of unit roots at the 5 percent significance level.[14]

Table 4 presents the regression results for the six types of financial assets. The t-ratios shown in the table use robust standard errors using the Newey-West correction with the Schwartz information criteria determining the order of the autocorrelation. The results are somewhat consistent with the predictions of the model. In all cases, the signs of β_3 are negative and in most cases the largest in magnitude, as predicted by the model. Moreover,

[13]Total returns reinvest any dividend or interest payments made through out the year at current price of the respective securities. Common stocks is analogous to the S&P 500, and small companies are companies with low levels of capitalization.

[14]I followed the procedure outlined in Hamilton [1994], chapter 17.7 to determined the number of lags included in the unit root test.

the coefficients are often the most statistically significant. However, only two of the six β_3s are statistically significant.

The significance of the β_3s and of the regressions is inversely related to the volatility of the securities. Figures 3 through 8 show this clearly. They show real annual total returns of the six assets along with the fraction of the population aged 45 to 54. Note that the axes for the size of the age group are inverted. The regression for Treasury bills, the asset with the lowest volatility, indicates that demographic factors explain nearly 50 percent of the variation in the real annual returns of Treasury bill, while the demographic factors explain none of the variation in the returns of either types of stocks, the assets with the highest volatility.[15] Given the differences in the annual volatilities between demographic variables and asset returns, this is not particularly surprising. Slow moving demographic factors will have more of an effect on assets with low annual volatility, so that high frequency movements are less likely to mask low frequency movements. In fact, a simple smoothing of assets returns with a three year centered moving average increases the adjusted R^2 to 0.19, -0.02, 0.42, and 0.42 for common stocks, small company stocks, long corporate bonds and long government bonds, respectively. Furthermore, such smoothing increases significance of the estimates shown in table 4, so that all but the coefficient for small company stocks are significant at 5 percent, without noticeably altering the values of the point estimates.

I also estimated the regression for Treasury bills using the first differences of the returns and demographic variables. Due to the large swings in real returns before 1950, I smoothed the changes in real returns by taking a five year centered moving average.[16] The last column of table 4 shows the results of the regression, and it shows that the relationship found using levels is also present in first differences. Figure 9, shows graphically the results of the regression. The adjusted R^2 drops to 0.26 but the magnitude and the significance of the relationship between the relative size of age group with the largest increment to wealth and the returns of Treasury bills are essentially unchanged.

[15]The different sizes of the relationship between age and the returns of equity and Treasury bills suggest it is possible that the equity premium may be influenced by the aging of the population, as suggested by Bakshi and Chen. The model presented in this paper, cannot however address this issue, although using their assumption of constant absolute risk aversion would probably induce such a result.

[16]I again used the Newey-West correction to calculate the standard errors, especially to correct the autocorrelation induced by the moving average.

To check the sensitivity of the regression estimates, I reestimated (5) for the period, 1948 to 1988. Table 5 presents the results of the estimates using the different sample period. It suggests that demographic variables have a significant relationship to returns of assets during the post-war era. The size of the coefficients are fairly robust to changes in the sample period and the variable for the proportion of the population that is between the ages of 45 and 54 consistently maintains a sizable negative relationship with the returns of various financial securities.

IV. Implications for Asset Returns in the United States

The results presented in this paper suggest that demographic variables play an important role in the determination of the low frequency movements in the the real returns of financial assets through individual's saving decisions, explaining nearly 50 percent of the variance of the annual real returns of Treasury bills. The fact that demographic factors play a role in financial markets which are usually assumed to be efficient may be surprising given the predictability of the changes in the relative size of the different age groups of the population. However if demographic factors affect the demand for all assets in a similar manner or if economic agents are liquidity constrained or myopic, it is possible that no arbitrage opportunities exist for agents to exploit. Given the results of the paper, the entrance of the baby boomer into the 45 to 54 age group portends to a period of low real rates of returns, especially for Treasury bills.

The empirical portion of the paper also suggests that assets with longer maturity are less influenced by life-cycle considerations than shorter-term assets. The framework provided here sheds no light as to why this should be true. A further examination of this difference may be an interesting avenue of research. The model would need to introduce some mechanism to induce age dependent changes in portfolio composition, like Bakshi and Chen.

Appendix A. A Production Economy

It is a straight forward matter to extend the above model to include production to make it a general equilibrium model. First, the budget constraint (2) now includes wages.

$$a_{t+s-1,s} = (1+r_t)\, a_{t+s-2,s-1} + w_{t+s-1} e_s - c_{t+s-1,s} \tag{A1}$$

where e_s is now a measure of age dependent labor productivity. The labor force in each period t, equals the sum of the population age distribution times labor productivity at each age.

$$L_t = \sum_{s=1}^{T_l} \varphi_t(s)\, e_s \tag{A2}$$

Given the asset profile of individuals, aggregate capital is merely the sum of all assets of every individual present in the economy. The aggregate level of capital equals

$$K_{t+1} = \sum_{s=1}^{T_l} \varphi_t(s)\, a_{t,s} \tag{A3}$$

If the aggregate production function has constant returns to scale and markets are competitive, the equilibrium rate of return of capital is

$$r_t = f'(k_t) \tag{A4}$$

where k_t is the capital-labor ratio and $f(k_t)$ is the net production function of the economy. Under the same conditions equilibrium wages equal

$$w_t = f(k_t) - f'(k_t)\, k_t \tag{A5}$$

In addition the economy grows at some exogenous rate γ, the rate of labor augmenting productivity growth. To close the model, I assume a simple Cobb-Douglas production function with labor augmenting productivity growth for the economy.

$$f(k_t) = (1+\gamma)^t\, k_t^{\alpha} \tag{A6}$$

where α is capital's share of output.

Table 1: Model Parameters

parameters		value
T_l	lifespan	80
T_a	retirement age	65
T_c	years of childhood	20
n	initial pop. growth rate	0.01
ϵ	size of baby boom	0.01
τ	duration of baby boom	15
δ	subjective discount rate	0.015
ρ	coefficient of relative risk aversion	4

Figure 1: Simulated Relationship Between Age Distribution and Returns

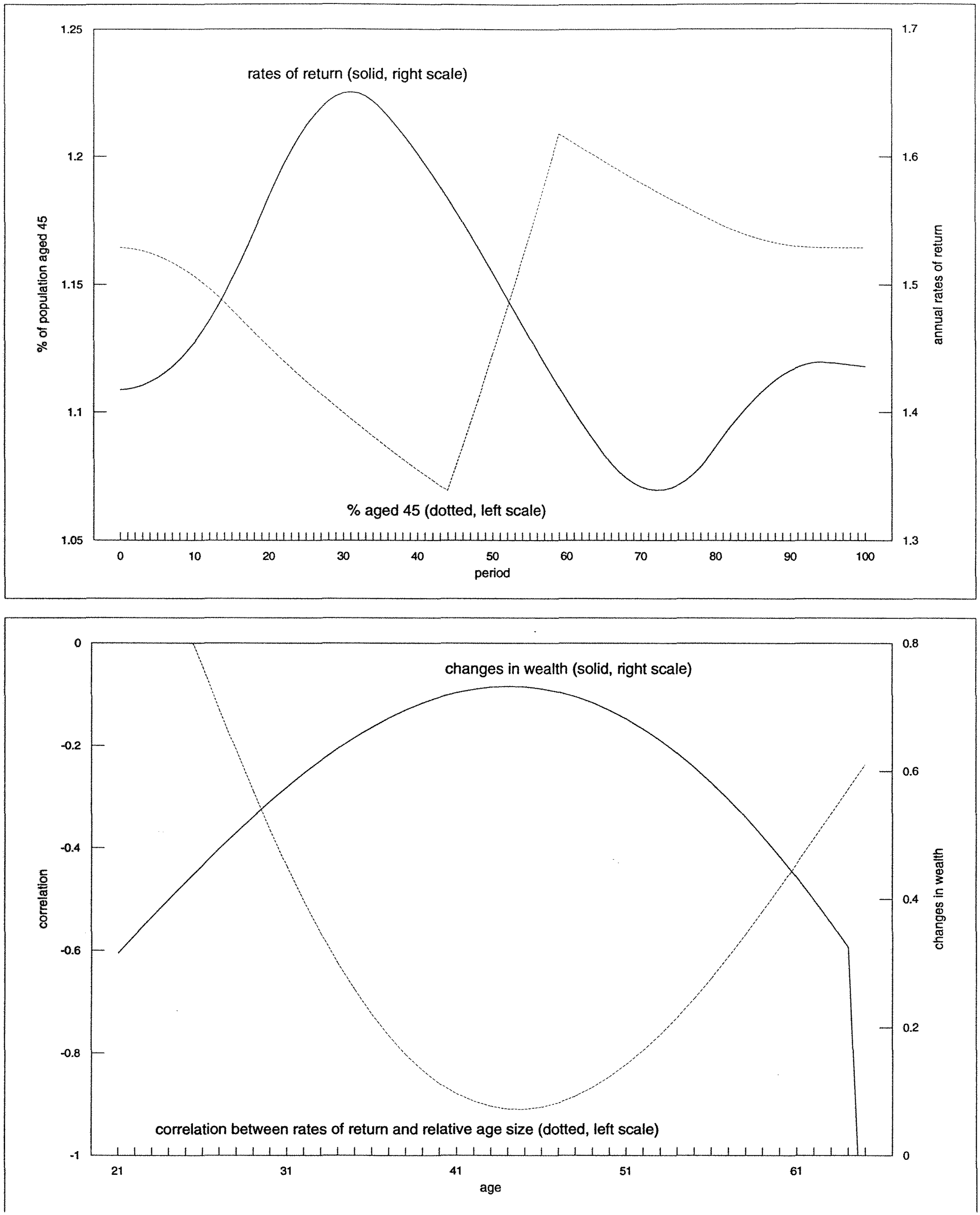

Table 2: Cross-Sectional Estimates of the Wealth-Age Profile

Age Group	Gross Assets	Net Wealth
25-34	-34.53	-39.42
	1.62	*1.91*
35-44	-38.83	-47.99
	1.72	*2.20*
45-54	41.82	35.96
	1.80	*1.60*
55-64	58.03	55.03
	2.47	*2.42*
65+	29.47	32.99
	0.86	*1.00*
F Statistic	7.57*	8.70*
adj. R^2	0.29	0.28

Note: t-ratios in italics. * denotes significance at 1%.

Figure 2: Net per Capita Purchase of Equities by Households

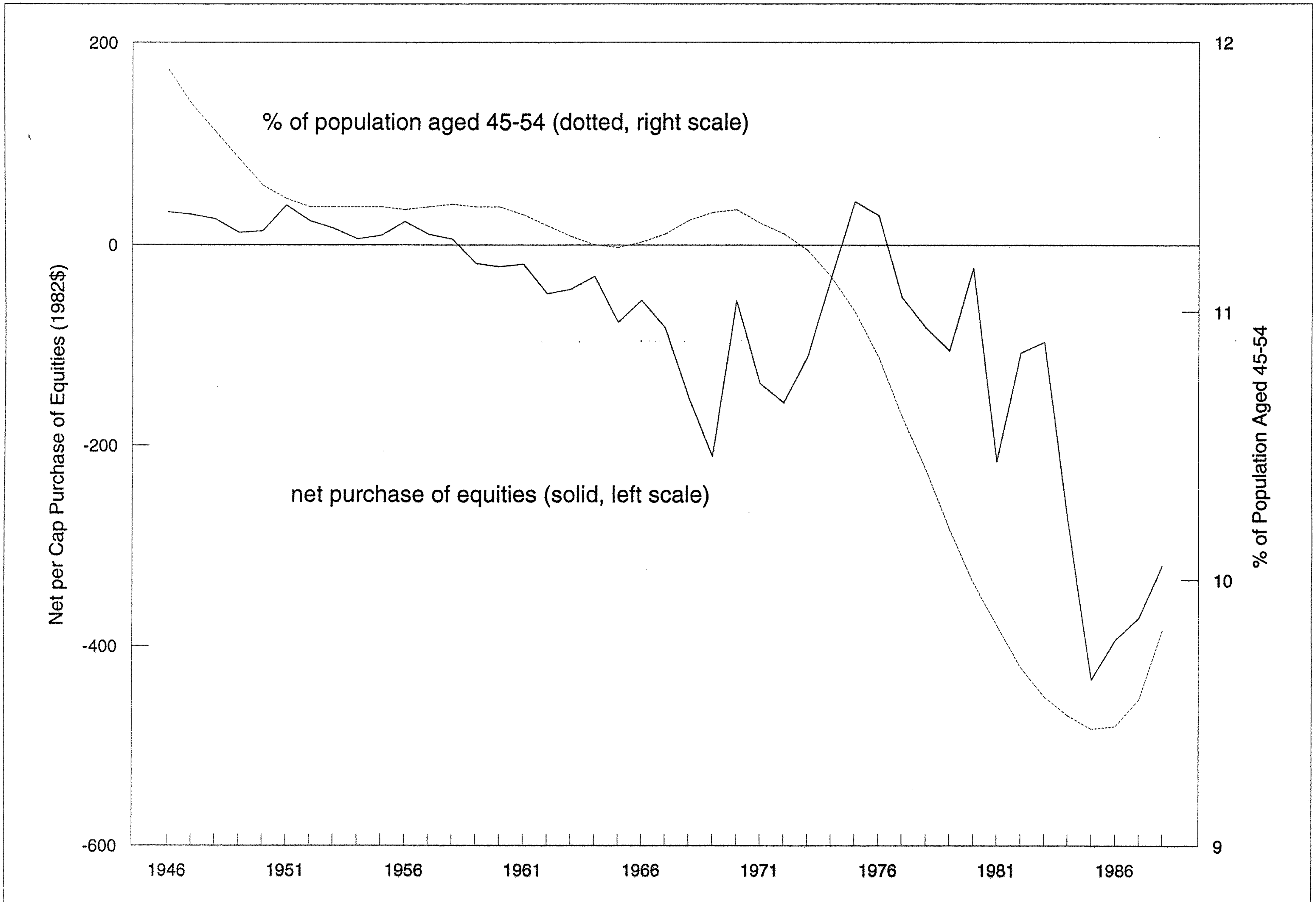

Table 3: Aggregate Household Wealth

Age Group	Gross Assets	Net Wealth
25-34	0.98	-2.41
	1.69	*2.30*
35-44	3.53	4.19
	2.14	*1.46*
45-54	21.82	11.94
	5.52	*2.70*
55-64	18.80	16.62
	2.36	*1.28*
65+	8.76	6.40
	5.08	*3.28*
adj. R^2	0.49	0.47

Note: t-ratios using Newey-West robust standard errors in italics.

Table 4: Age Distribution and Total Returns of Financial Assets (1926-88)

	Equities		Bonds				
Age Group	Common	Small Co.	Long Corp.	Long Gov.	Inter. Gov.	T Bills	Δ T Bills
constant	41.03	-7.45	80.60	67.44	84.23	85.65	-0.15
25-34	-3.24	-1.53	-0.48	-0.31	-0.97	-1.37	-0.93
	1.29	*0.35*	*0.44*	*0.27*	*1.30*	*3.64*	*2.03*
35-44	6.52	3.03	1.50	1.55	1.06	0.75	0.45
	1.93	*0.52*	*1.01*	*1.02*	*1.05*	*1.49*	*0.67*
45-54	-17.82	-11.57	-5.98	-5.29	-6.38	-6.39	-4.29
	1.70	*0.64*	*1.31*	*1.12*	*2.06*	*4.08*	*3.57*
55-64	24.78	26.62	-3.03	-3.10	-0.68	0.53	-1.16
	1.47	*0.91*	*0.41*	*0.41*	*0.14*	*0.21*	*0.58*
65+	-9.83	-10.88	0.15	0.39	-0.63	-0.98	1.03
	1.40	*0.90*	*0.05*	*0.12*	*0.30*	*0.93*	0.34
DW	2.16	1.81	1.81	2.00	1.79	1.36	1.37
adj. R^2	0.00	-0.07	0.15	0.11	0.21	0.49	0.26

Note: t-ratios using Newey-West robust standard errors in italics.

Figure 3: Real Annual Total Returns - Common Stock

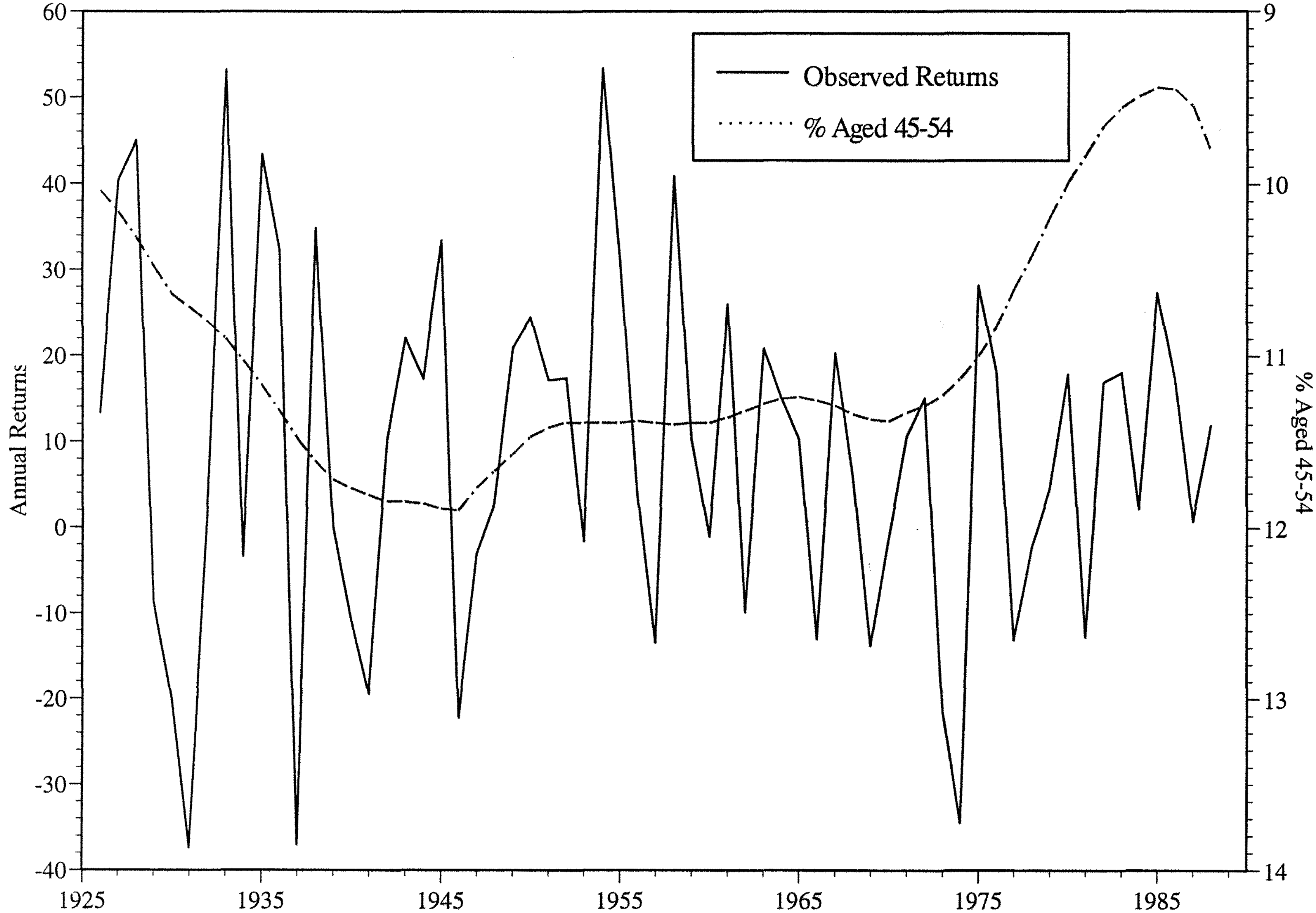

Figure 4: Real Annual Total Returns - Small Company Stock

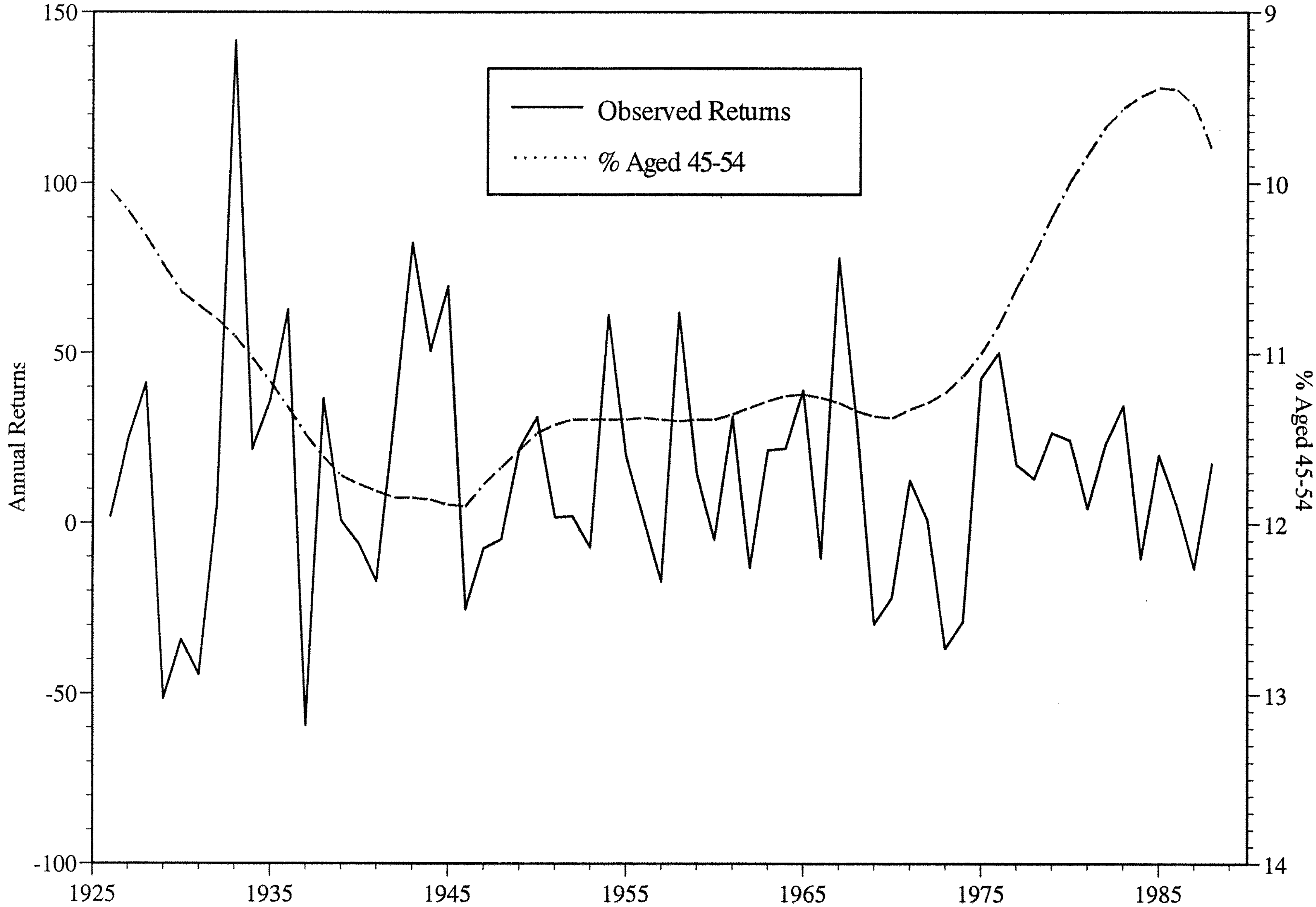

Figure 5: Real Annual Total Returns - Long Corporate Bonds

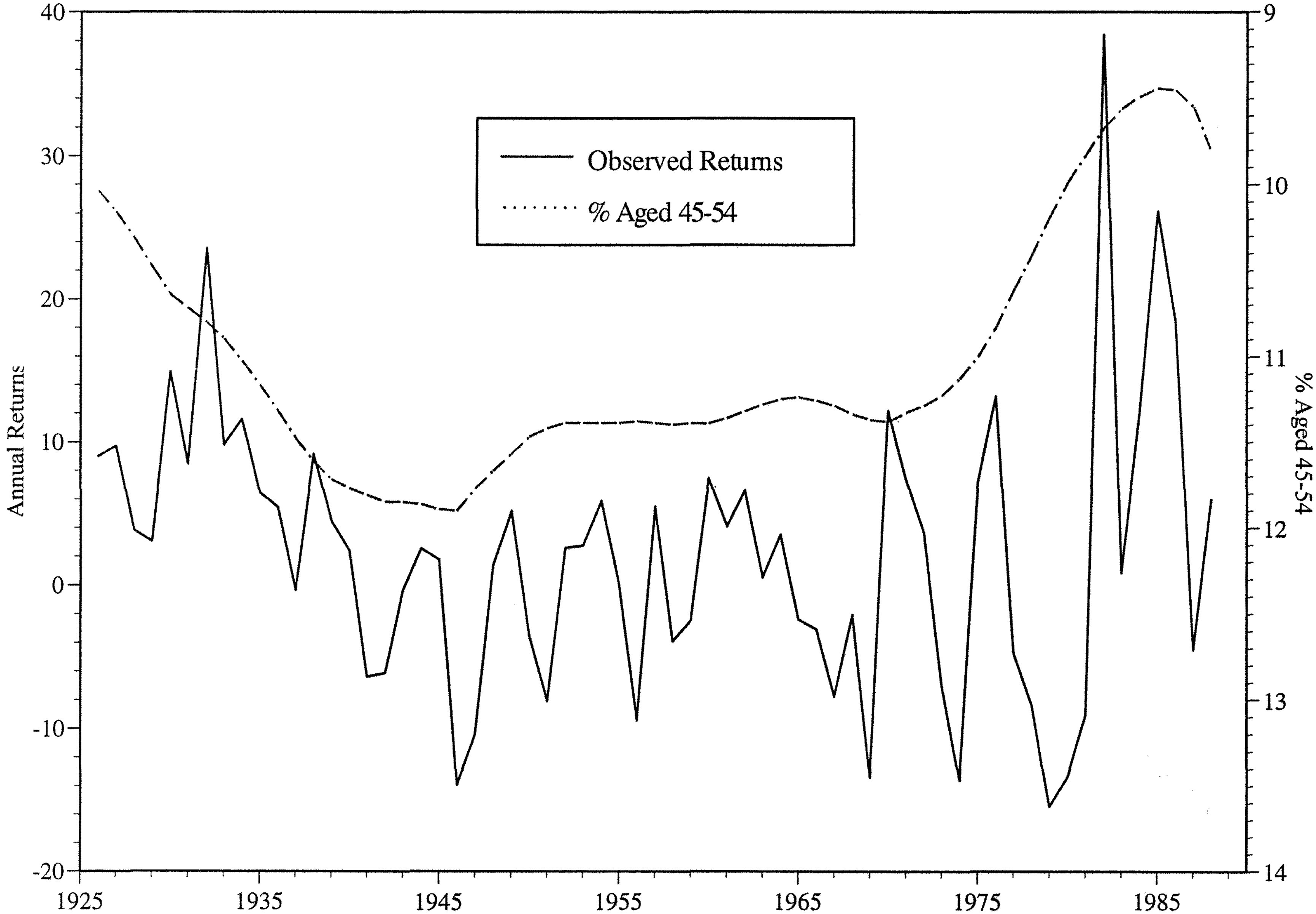

Figure 6: Real Annual Total Returns - Long Government Bonds

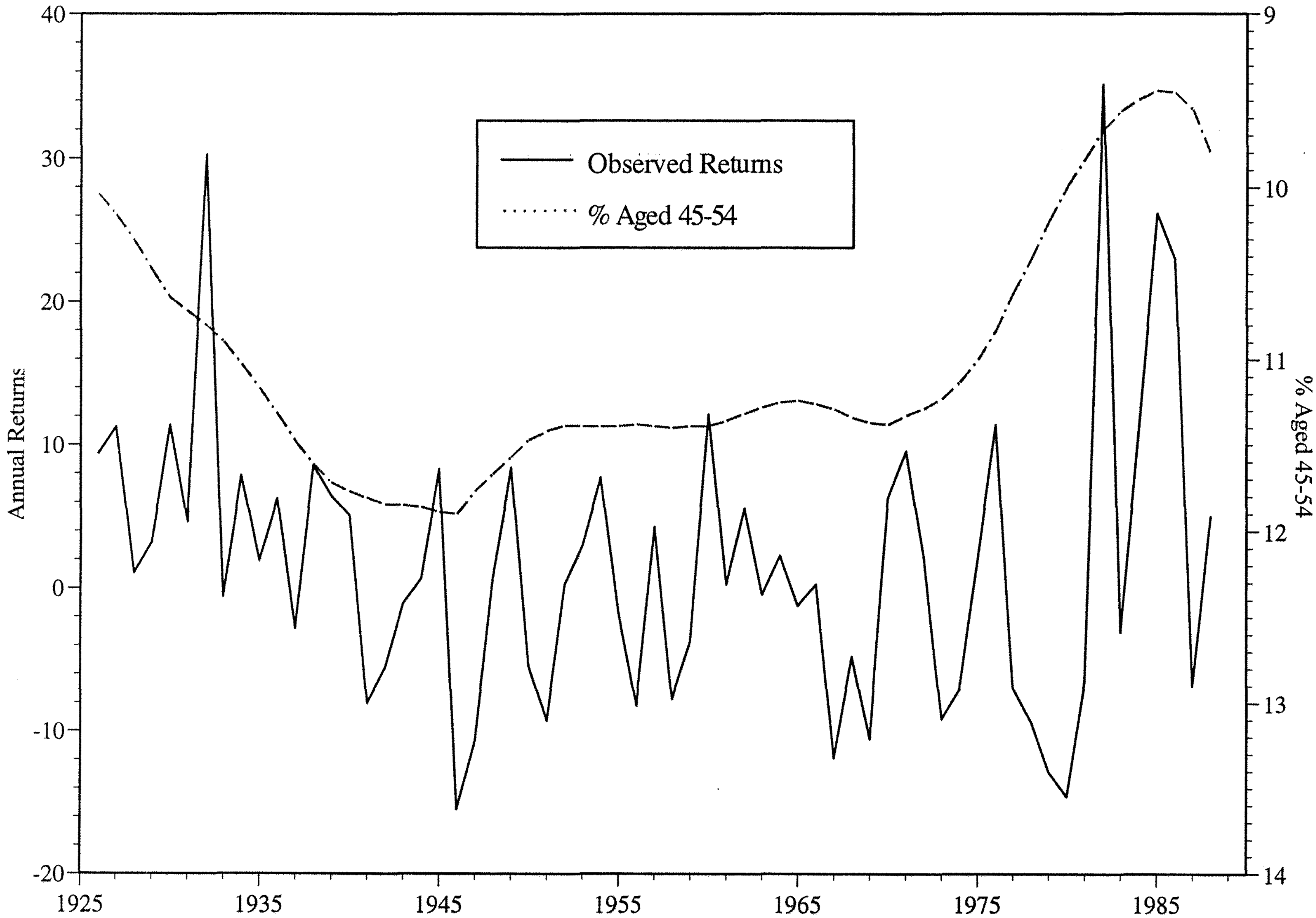

Figure 7: Real Annual Total Returns - Intermediate Government Bonds

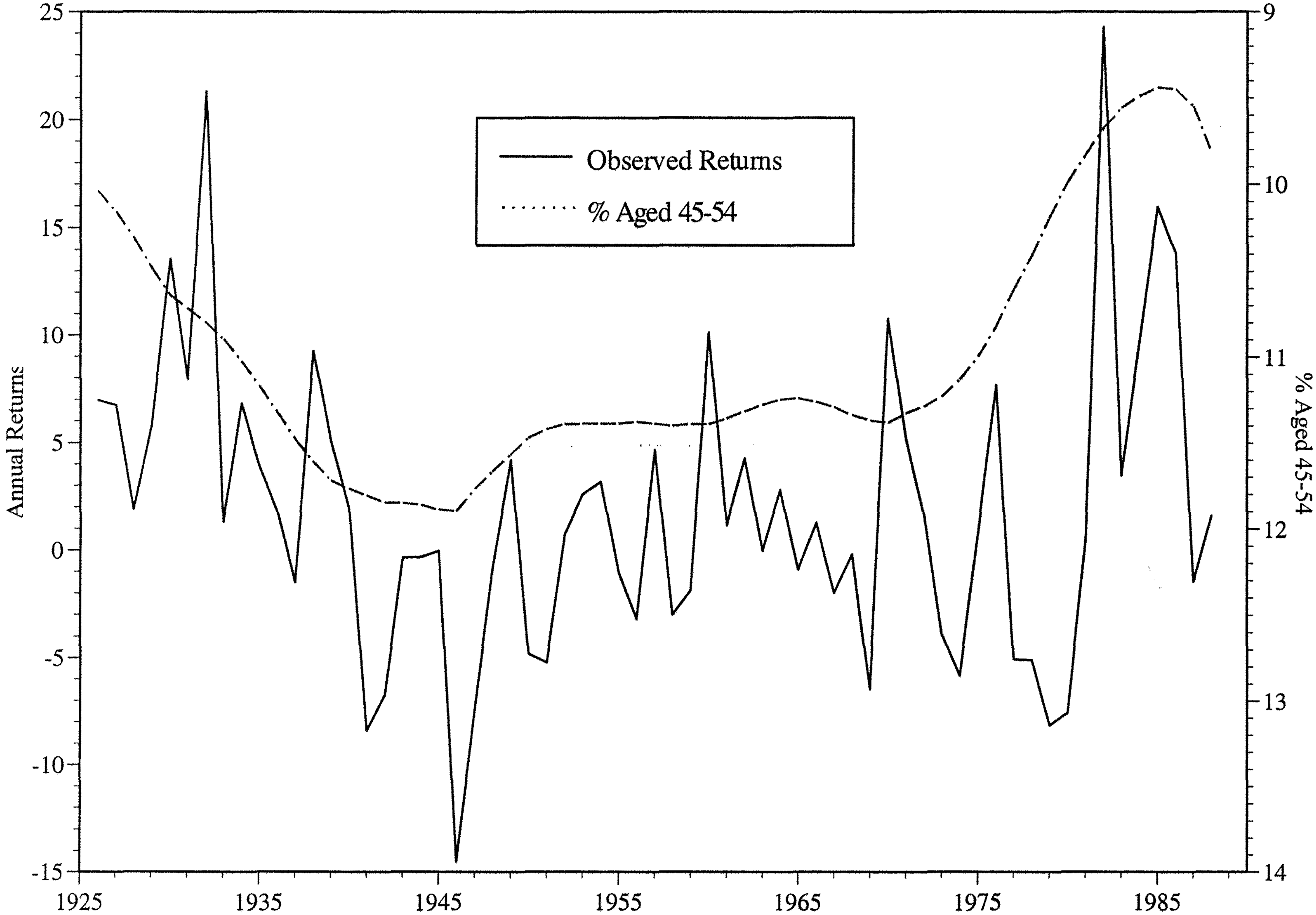

Figure 8: Real Annual Total Returns - T Bills

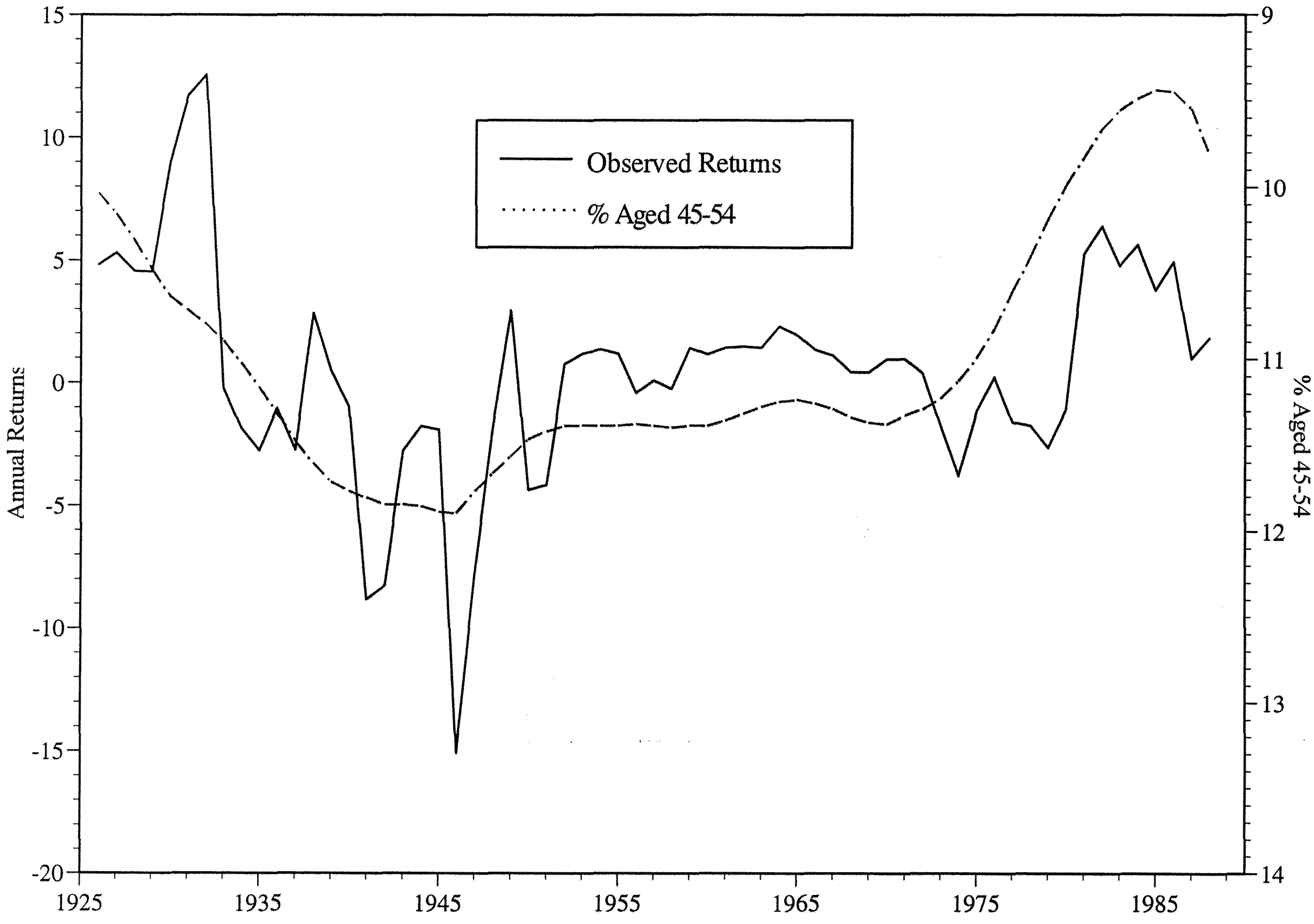

Figure 9: Real Annual Total Returns - T Bills (5yr centered MA)

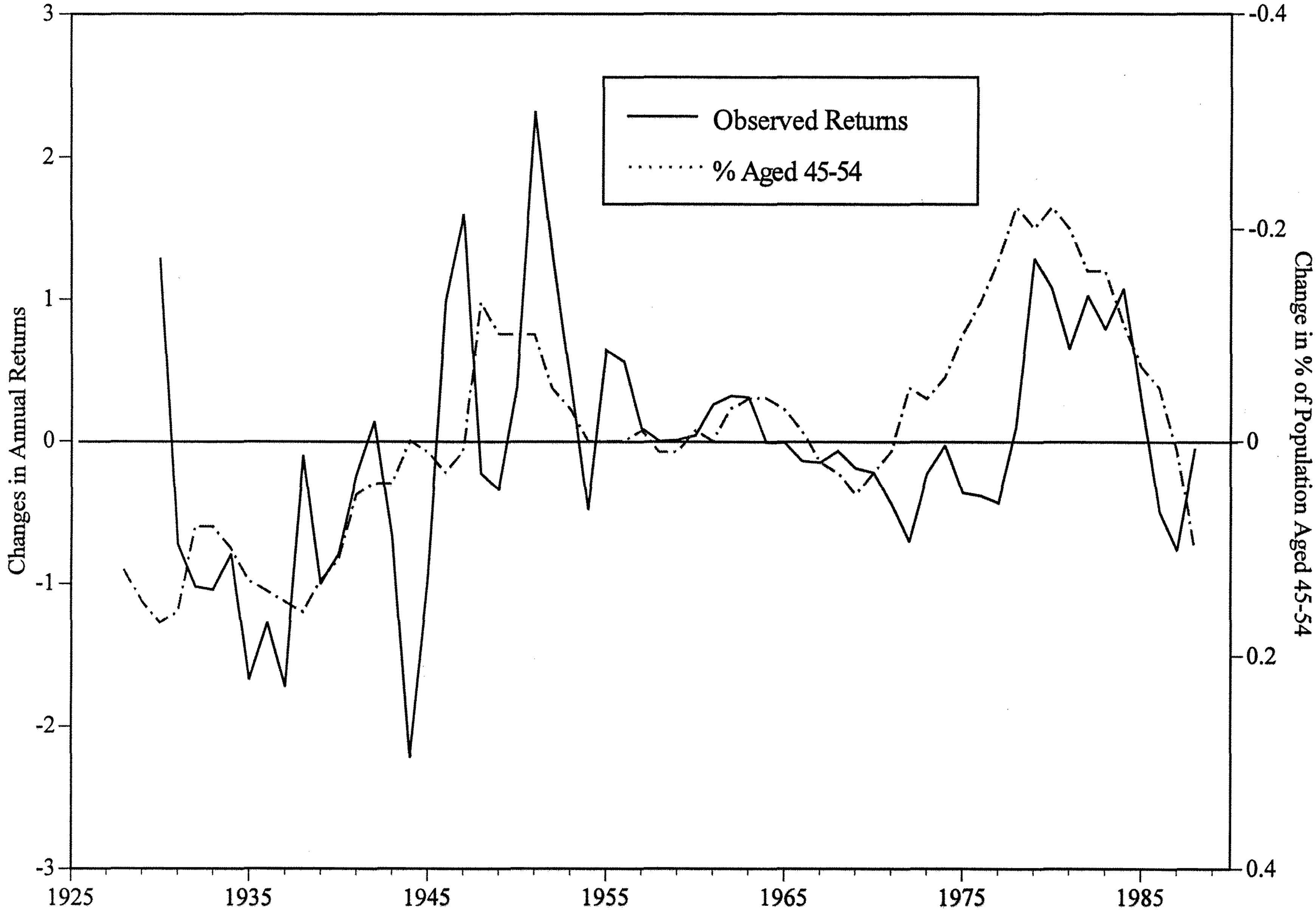

Table 5: Age Distribution and Total Returns of Financial Assets (1948-88)

	Equities		Bonds			
Age Group	Common	Small Co.	Long Corp.	Long Gov.	Inter. Gov.	T Bills
constant	-1.96	11.82	1.84	2.20	0.48	0.66
25-34	-1.60	-1.57	-0.52	-0.42	-1.53	-1.17
	0.39	*0.24*	*0.20*	*0.17*	*0.98*	*2.57*
35-44	7.89	-9.42	0.57	0.22	1.93	0.88
	0.55	*0.42*	*0.06*	*0.03*	*0.36*	*0.56*
45-54	-3.49	-46.33	-10.01	-11.21	-7.30	-5.98
	0.10	*0.87*	*0.47*	*0.54*	*0.57*	*1.61*
55-64	21.98	-34.34	-6.23	-7.85	4.77	2.13
	0.35	*0.34*	*0.16*	*0.20*	*0.20*	*0.30*
65+	-3.23	-21.30	-1.71	-2.32	-1.20	-1.40
	0.21	*0.88*	*0.18*	*0.25*	*0.21*	*0.84*
DW	2.45	2.10	1.88	1.90	1.81	1.61
adj. R^2	0.03	-0.10	0.00	0.02	0.07	0.43

Note: t-ratios using Newey-West robust standard errors in italics.

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